

**Ceiling Mount
PIR Detector with Self-Test
DS938Z**



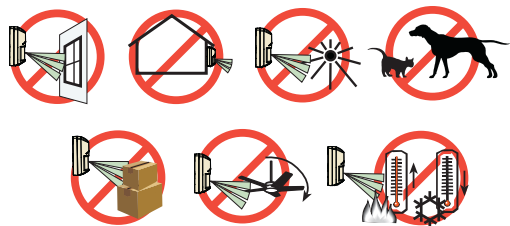
en Installation Guide



Reading Bosch Security Systems, Inc. Product Date Codes

For Product Date Code information, refer to the Bosch Security Systems, Inc.
Web site at: <http://www.boschsecurity.com/datecodes/>.





-29°C to +50°C
(-20°F to +120°F)
UL Listed installations, the temperature range is 0°C to +50°C (+32°F to +120°F)

0 - 95% Relative Humidity
(0 - 85% UL/C-UL Installations)

CE EN 50131-2-2 Grade 2
EN 50130-5 Environmental Class II
IP30 IK04 (EN 60529, EN 62262)

Changes or modifications not expressly approved by Bosch Security Systems, Inc. can void the user's authority to operate the equipment.

UL/C-UL
Perform Walk Test at least once a year.
Use only a Listed limited-power source.
The Listed control unit or a Listed burglary power supply must provide 4 hours (20 mAh) of standby power.
Install the unit in accordance with National Electrical Code NFPA 70 and Part 1 of the Canadian Electrical code CSA C22.1.
Adjust the microwave range control, if necessary, to achieve maximum range.

SELV
Connect all wiring to a safety extra-low voltage (SELV) circuit only.
Ligue todas as cablagens apenas a um circuito de segurança de tensão extra baixa (SELV).
Conecte el cableado únicamente a un circuito de seguridad para voltajes muy bajos (SELV).
Alle Drähte sind ohne Ausnahme an Niederspannung anzuschließen.
Sluit alle bedrading uitsluitend aan op een circuit met een extra lage veiligheidsspanning.
Prenez soin de connecter tous les câbles à un circuit à très basse tension de sécurité (TBTS).
Collegare tutti i cavi esclusivamente a un circuito SELV (circuito di sicurezza a bassissima tensione).

Region	Certification	
Europe	CE	EN50131-2-2, Grade 2 EN50130-5 Environmental Class II
Poland	TECHOM	98/07 Klasy "C"
USA	UL	ANSR: Intrusion Detection Units (UL639)
Sweden	INTYG	04-683

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7.2 Selecting the Optical Module

- For ceilings between 8 and 13 ft. (2.4 and 4.0 m) from the floor, use the optical module marked AR8-13. This marking can be found next to the two optical module tabs.
- For ceilings between 13 and 18 ft. (4.0 and 5.5 m) high, use the optical module marked AR13-18.
- To replace an optical module, push the optical module tabs towards the center until the module snaps free of the circuit board. Holding the new module by the tabs, snap the new module into place.



NOTICE!
When replacing the mirror, make sure it is facing the same direction as before it was removed.

- Replace the enclosure onto the base.
- Close cover and turn clockwise to secure.



NOTICE!
Avoid fingerprints on the mirrored surfaces. Should the mirrored surfaces become soiled or otherwise marked, they can be cleaned using a soft, clean cloth and any commonly available, mild window cleaner.

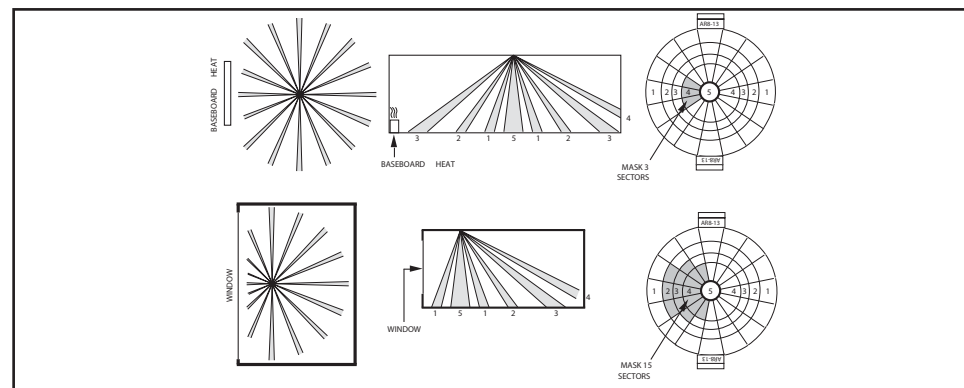


Figure 7.2: Masking

8 Coverage

- 360° by 60 ft. (18.3 m) diameter coverage when mounted on 8 to 18 ft (2.4 to 5.5 m) high ceilings.
- The coverage pattern consists of 64 zones grouped into 16 barriers, with one additional zone looking straight down from the unit (sabotage). Each barrier is 30 ft (9.2 m) long and 4.4 ft. (1.3 m) wide at 30 ft (9.2 m).
- The DS9382 comes with a choice of two optical modules. Refer to Section 5.1 to determine the best module for on ceiling height.

If the time period selected has elapsed from the last alarm, the LED will flash two times and the Trouble Output will activate.

Setting the Motion Monitor timer to shorter periods can be used to force a protection walk test of remotely located zones.

It is recommended that the 30 day timer be selected. This verifies that the unit is operational and avoids nuisance trouble conditions caused by holidays, vacations, etc.

7 Optical Module

7.1 Optical Module Masking

Peel-off masks are provided with the unit for each segment of the optical module to allow for customized coverage, or to block out areas of objects that may cause thermal disturbances. The mask is self-adhesive and pre-cut in the shape of the optical module.

The location of the zone to be masked depends on the position of the detector. Therefore, determine the mirror surface to be masked before removing the mirror from the detector.

To block out a particular zone or group of zones, peel off a section of the mask that corresponds to the appropriate zone, and stick it on the mirror segment. Before attempting any masking, be sure the chosen mirror surface is the correct one. Refer to *Figure 7.1* to identify mirror segments and zones.



NOTICE!

When disabling the look-down segment, do not mask segment 5 directly as this will disable the entire detector. Instead, mask the segment on the dome directly below segment 5.

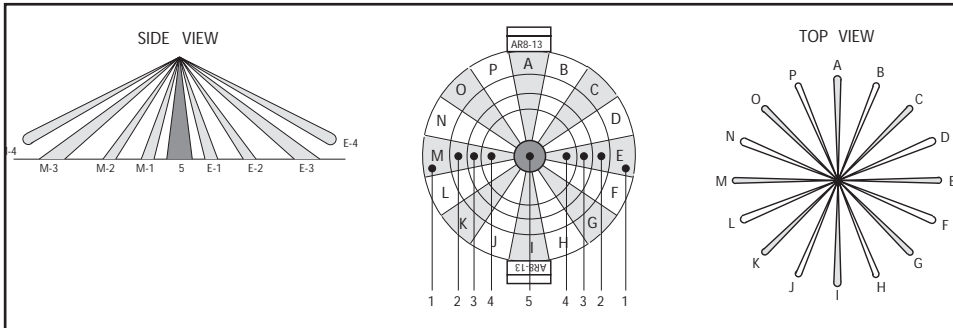


Figure 7.1: Mirror module to pattern reference



NOTICE!

When attempting to remove any masking, many adhesives will either destroy the mirror surface or leave enough residue behind to reduce coverage performance.

1 Overview

The DS938Z is a high performance passive infrared intrusion detector. It is equipped with advanced PIR detection and supervision circuits and is designed to provide an alarm condition upon detection of an intruder passing through its area of coverage.

Employing balanced dual-opposed sensing elements, the DS938Z passive infrared (PIR) detector makes use of the fact that all objects give off (emit) infrared energy, and that the warmer an object is, the greater the amount of infrared energy given off. The DS938Z uses PIR receiver technology designed to detect the change in infrared energy caused when a target of a different temperature from a stable background passes through its field of coverage.

The coverage pattern consists of sensor zones arranged to form a circular coverage pattern.

Using Motion Analyzer II circuitry, the detector must first see a change in infrared energy in one zone followed by a change of energy in the remaining zone. Therefore, disturbances that occur in only one finger do not constitute motion and are ignored. This “catch sensitivity” may be changed in the field by the installer to provide the degree of sensitivity required by the installation.

Self-test and supervision circuits provide reliable operation in a variety of installation environments. The result is a highly advanced detector offering superior performance with freedom from false alarms.

Specifications	
Dimensions (HxDia)	3.5 in. x 5.25 in. (8.9 cm x 13.3 cm)
Input Power	6.0 to 15.0 VDC; 5 mA standby, 20 mA in alarm with LEDs enabled. Use only an Approved Limited Power Source.
Alarm Relay	Silent-operating Form “C” relay. Contacts rated <100 mA, 25 VDC, 2.5W maximum, <20 Ohm closed for DC resistive loads.
Tamper	Contacts rated at 28 VDC, 125 mA maximum, <1 Ohm. Connect tamper circuit to a 24-hour protection circuit.
Trouble Output	Maximum current load is 25 mA.
Optional Accessory	TC6000 test cord.

2 Mounting

Select a location likely to intercept an intruder moving beneath and across the coverage pattern. Refer to *Figure 2.1*. Recommended mounting height range is 8 to 18 feet (2.4 to 5.5 m).

The surface should be solid and vibration-free. (i.e. Drop tiles should be secured if the area above the tiles is used as an air return for HVAC systems).

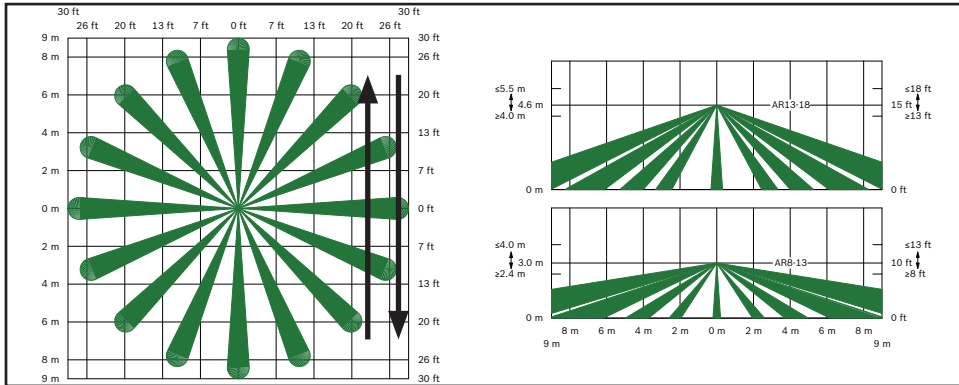


Figure 2.1: Coverage Pattern

1. Remove the base from the enclosure by pressing the two enclosure release tabs inward while lifting the enclosure away from the base. Refer to *Figure 2.2*.

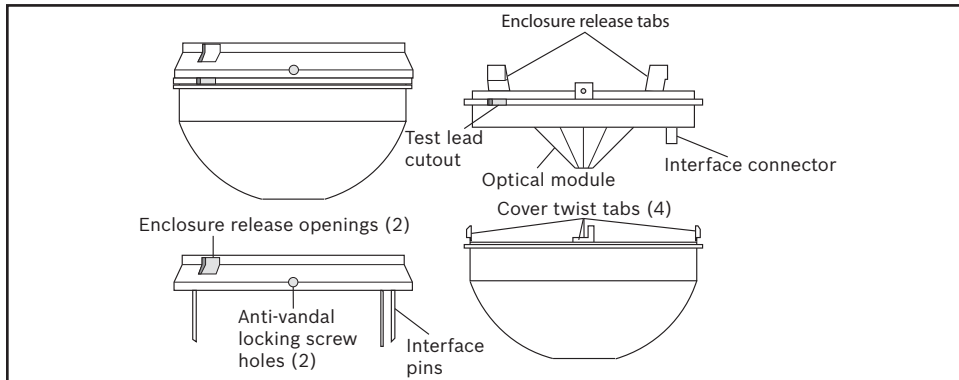


Figure 2.2: Opening cover



NOTICE!

Slightly rock the enclosure side-to-side during removal to overcome the friction caused by the base-to-enclosure terminal pins.

2. Open the cover by turning counterclockwise.
3. Route wiring as necessary to the rear of the base and through the center hole. Refer to *Figure 2.3*.

6.2 False Alarm Prevention

Turn on all heating and cooling sources that would normally be in operation during times of protection. Stand away from the unit and outside the coverage pattern, then monitor the background noise for at least three minutes.

Readings should not deviate from the reference level more than ± 0.15 VDC. For readings outside these limits; eliminate the cause, rotate the unit slightly, or mask out the mirror segment(s) looking down at the thermal disturbance.

6.3 Coverage Margin

Again walk across the farthest edge of required coverage.

A minimum voltage change of 1.0 VDC from the reference level is required in the wintertime when the background temperature is cool. This will make up for summertime, when the background is warmer. If testing the unit in the summertime, the minimum recommended voltage change is 0.75 VDC.

When testing is completed, remove the TC6000 Test Cord, and twist-lock the cover into place.

6.4 Supervision Feature

The DS938Z performs several supervision features that, combined with the advanced motion detection capabilities of the detector, provide an extremely high level of security. A supervision trouble condition is indicated at the detector by the Alarm/Test LED (see the Supervision Display Chart).

- The LED indicates the cause of the supervision trouble using coded pulses. The supervision trouble signal activates the Trouble Output available at terminal 8, which should be connected to a 24-hour zone.

The supervision features function as follows:

LED	CAUSE
ON	Unit alarm
2 Flashes	Motion monitor time out
4 Flashes	PIR self-test failure

PIR: The operation of the PIR is electronically checked approximately every 12 hours. If the PIR fails, the Alarm/Test LED will flash four times and the Trouble Output will activate.

Motion Monitor Supervision: This feature verifies that the detector has a clear view of the detection area and has not been blocked. When selected using switches S4 and S5, a supervision timer is activated. A trouble condition will be indicated if the detector has not alarmed at least once during the selected time period (this feature can be disabled by placing both switches in the Off position). The time period selected should be long enough to allow adequate time for holiday weekends.

Refer to *Section 4.0 Feature Selection* for proper switch settings.

**NOTICE!**

The use of a Sonalert type device (sounder) will provide an audible tone during the time the unit is in alarm. Of the three available connector pins, the center pin is positive (+) with respect to either outside pin (outside pins are common (-)). Use of the sounder is intended only as an aid for walk testing during installation.

- Place the cover on the unit, and twist-lock it clockwise into place.

**NOTICE!**

Be sure the TC6000 and Sonalert leads are dressed through the cut-out.

- Apply power to the unit.
- Wait at least two minutes, after applying power, to start walk tests.

**NOTICE!**

Walk testing should be done across the coverage pattern as shown.

- The edge of the coverage pattern is determined when the Alarm/Test LED indicator (and optional Sonalert®, if installed) first turns on.
- Walk test the unit from all directions to determine the boundaries.
- After completion of the walk tests, remove the Sonalert® (if installed).

6 Final Tests

6.1 Noise Measurement

**NOTICE!**

Meter readings are very important in determining background disturbance levels and catch margin sensitivity.

- Connect a 20,000 ohm/volt (or greater) DC VOM to the Noise Voltage connector using the TC6000 as shown. Set meter scale for about 3.0 VDC.
- The base reference level for reading background noise or target voltages is approximately 2.0 VDC. Installations in quiet environments, therefore, will result in a steady meter reading between 1.9 and 2.1 VDC. Look for areas and sources of thermal disturbances if the meter fluctuates greatly.

**CAUTION!**

Be sure all wiring is unpowered (de-energized) before routing.

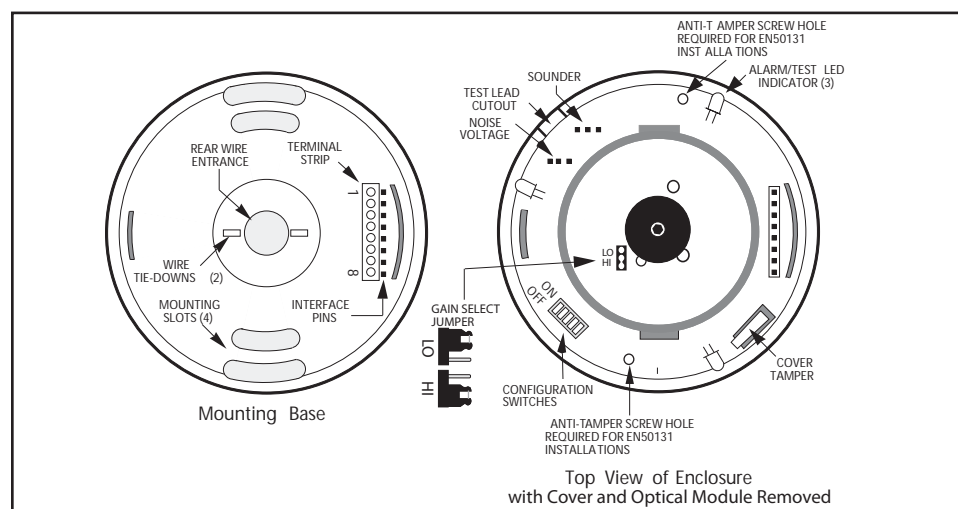


Figure 2.3: Overview

- Firmly mount the base. Depending on local regulations, the base may be directly surface mounted using anchors, mollies, or wing-nuts, or may be mounted to standard 4-inch octagonal or square electrical boxes.

**NOTICE!**

The DS938Z base will not completely cover a 4-inch square box. Where aesthetics are important, a 4-inch octagonal box is recommended.

**NOTICE!**

Mounting to removable ceiling tiles is not recommended unless a sandwich is made of the base, ceiling tile, and a back plate behind the tile. Covers used for 4-inch octagonal and square boxes make a suitable back plate (when used with bolts and wing nuts, as an example).

3 Wiring

**CAUTION!**

Only apply power after all connections have been made and inspected. Do not coil excess wiring inside detector. Use no smaller than #22 AWG (0.8 mm) wire in the terminal strip.

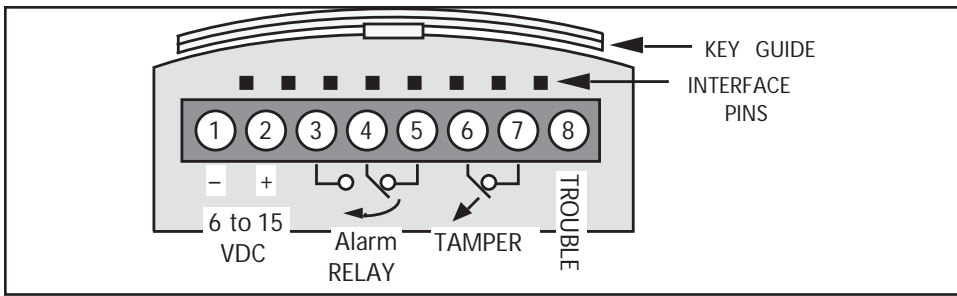


Figure 3.1: Wiring to terminals

Terminals 1 (-) & 2 (+): Power contacts.

Terminals 3 (NO), 4 (C), & 5 (NC): Alarm relay contacts. Use terminals 4 & 5 for Normally Closed circuits. Do not use with capacitive or inductive loads.

Terminals 6 (T) & 7 (T): Normally Closed tamper contacts.

Terminal 8 (TR): Solid state Trouble output. Shorts to ground (-) when the detector is in a Trouble condition.

4 Feature Selection

The DS938Z has several features that are controlled using the configuration switches.

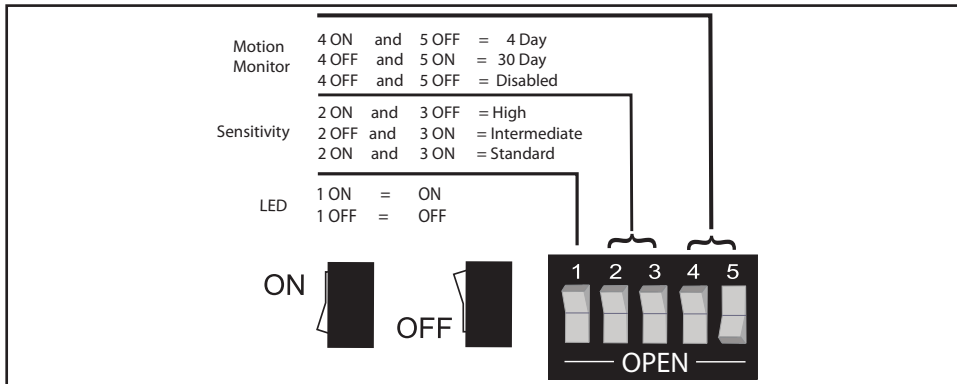


Figure 4.1: Selecting features

4.1 LED Operation

ON: Allows the Alarm/Test LED to operate when activated by motion.

OFF: The LED will not operate on alarm activation, but will indicate a supervision trouble condition.

4.2 Sensitivity Selection

Sensitivity modes depend on the type of coverage desired and the installation environment.

- **Standard Sensitivity:** Tolerates environment extremes on this setting, but requires the largest amount of intruder motion to achieve an alarm.
- **Intermediate Sensitivity:** The recommended setting for most installations. Use in locations where an intruder is expected to cover only a small portion of the protected area. Tolerates normal environments on this setting. The detector is shipped in Intermediate Sensitivity mode.
- **High Sensitivity:** The setting for fast response to intruder signals. For use only in extremely quiet environments where ceiling drafts, and thermal and illumination transients are not anticipated.

If both switches are in the OFF position, the unit will default to the intermediate setting.



NOTICE!

Although the sensitivity modes provide different degrees of tolerance to environmentally caused alarms, the installer should assure peak background noise voltage readings do not exceed ± 0.15 VDC. (See Section 8.0 Final Tests).

4.3 Signal Gain

The DS938Z permits selection of the signal gain depending upon the environment to be protected. The gain select jumper is located under the optical module. Refer to *Figure 2.3*.

- **High Gain:** Recommended for large coverage applications up to 60 ft. (18.3 m) in diameter. The DS938Z is shipped in this setting. If the gain select jumper is missing, the unit will default to High Gain.
- **Low Gain:** Recommended for applications where the area to be covered is 40 ft. (12.2 m) or less in diameter and for applications where High Gain may be too sensitive for environmental extremes.



NOTICE!

Setting the DS938Z for Low Gain reduces the coverage area to 40 ft. (12.2 m) in diameter.

5 Setup and Walk Testing

1. Attach a TC6000 Test Cord to the Noise Voltage terminals. Since the outside terminals are common, polarity is not important and the black lead may be toward or away from the optical module.
2. Attach a Sonalert to the sounder pins at this time if one will be used during walk testing.